If you are using a printed copy of this procedure, and not the on-screen version, then you MUST make sure the dates at the bottom of the printed copy and the on-screen version match.
The on-screen version of the Collider-Accelerator Department Procedure is the Official Version. Hard copies of all signed, official, C-A Operating Procedures are available by contacting the ESSHQ Procedures Coordinator, Bldg. 911A

C-A OPERATIONS PROCEDURES MANUAL

15.5.6 Installation of AGS Chamber Clamps

(Vacuum Group Procedure VA-008.18.1.6)

Note: This document was formerly a C-A Group Procedure. The content of the group procedure was reviewed by the Technical Supervisor. All approvals and/or issue dates of the original group procedure are maintained for present use.

Hand Processed Changes

HPC No.	Date	Page Nos.	Initials

Approved: _____***Signature on File***_____ _____
Collider-Accelerator Department Chairman Date

S. Gill

Vacuum Group Procedure VA-008.18.1.6
Original Issue Date: 01/01/00
Revision 01

*****IMPORTANT*****

PRIOR TO THE PERFORMANCE OF ANY WORK WITHIN THE SCOPE OF THIS PROCEDURE, IT IS THE RESPONSIBILITY OF THE SUPERVISOR TO ENSURE THAT ***WORK PLANNING*** HAS BEEN REVIEWED FOR THE PROTECTION OF WORKERS, EQUIPMENT, AND THE ENVIRONMENT

1. Purpose:

1.1 To provide an effective procedure for AGS vacuum technicians to successfully install a chamber clamp in the AGS ring.

2. Responsibilities:

2.1 The AGS vacuum supervisor shall be responsible for the implementation of this procedure.

The following procedures are to be followed when removing the clamps, seals, and RC networks, and installing the new or refurbished clamps in the AGS ring. Any variation to these procedures which are found to improve the efficiency of this operation must be reported to the writers of these procedures so that it can be evaluated and these procedures can be updated.

3. Procedure

1) BLEED-UP THE VACUUM SECTOR

The vacuum sector should be vented to atmospheric pressure in accordance with Procedure AGS 8.18.1.1

2) REMOVE THE CLAMPS AND SEALS

Remove, inspect, and store the RC networks in accordance with Procedure AGS 8.18.1.46

Loosen both bolts and the clamp and loosen the swing bolt on the outside and swing it out of the slot. Supporting the bottom segment, push it clear of the flange pair and then pull the top segment off and remove the clamp. If the flanges remain hard together because of spray sealant or bellows preload separate them by hand before removing the seal and seal retainer. (Do not allow the seal and retainer to scrap across the flange face; a second set of hands may be required to hold the flanges while removing the seal and retainer). Do not pry flanges apart with metal objects which can scratch the flange surface and chip the ceramic coating.

After the clamps and seals are removed, the flanges should immediately be covered with aluminum foil to prevent dirt and moisture from entering the beam pipe. Unless the flange is being actively worked on, the aluminum foil should always be in place.

If a diamond seal has been removed, it should be saved for removal of the hanger pins. If a delta seal has been removed, the retainer should be cleaned and saved for reuse. The pinless diamond seals and the retainerless delta seals should be disposed in the radioactive material trash cans located in the ring.

3) CHECK FOR CHAMBER SHORTS

Make sure that both end flanges are not in electrical contact with the adjacent chamber flange. Clear the shorts if necessary before proceeding.

4) CLEAN THE FLANGES

The flanges should be cleaned one at a time. All traces of dirt and old leak sealant must be removed. Use scotch-brite pads, alcohol, and acetone as needed.

The aluminum foil should only be removed from the flange being cleaned. This will prevent the interior of the mating flange from being accidentally splashed with dirty cleaning fluid.

After the flanges have been cleaned they should be visually inspected for scratches and, where applicable, chips in the Ceramic coating. Any blemishes must be noted in the sector check off list.

5) CLEAN THE RETAINER

The aluminum retainers should be inspected to determine that they are free of dirt, oil, or old leak sealant. Also verify that the retainer has two hanger pins.

6) CLAMP REFURBISHMENT

Refurbish the clamp in accordance with AGS Procedure 8.18.7.

7) INSPECT THE CLAMP

Prior to installation in the ring the clamps should be inspected for the following:
1. All of the segments have been sprayed with lubricant
2. Both bolt threads have been lubricated
3. The Kapton dots are all in place on all four buttons
4. Both RC network retainers with E-rings are installed and tight.
5. The drive screws are tight
6. Other than the bolt threads the clamps should be free of any dirt and oils.

Any suspect clamp should be returned to the lab and tagged as a reject. The tag should include the reason for rejection, the inspector's signature and the date.

Loosen the bolt on the slotted trunnion side so that it will easily flip into place when the clamp is installed.

NOTE:

i. Once the flanges are cleaned and ready for the new seals and clamps this becomes a white glove operation. Clean gloves must be worn and care must be taken that they are not soiled by dirt in the ring or grease on the clamp bolts.

8) INSTALL THE SEAL

Inspect the seal for scratches on the knife edge, kinks or bends in the aluminum outer jacket, and that they contain a garter spring on the inside. Any suspect seals should be returned to the plastic bag. On the plastic bag a sticker should be attached which marks the seal as a reject with the reason for rejection, the inspector's signature and the date.

Place the seal in the retainer. These seals do not have a tight interference fit but they should fit well enough so they do not fall out. Poor fit may be cause for rejection of the seal.

Install the seal between the flanges using the hanger pins. If necessary have another technician hold the flanges apart while it is being installed so that the seal knife edge does not become smeared as it slides between the flanges.

9) INSTALL THE CLAMP

Install the clamp so that both bolt heads are facing up and the slotted trunnion is located towards the aisle as shown in figure (1). After the slotted trunnion bolt is flipped into place it should be tightened hand tight with the opposite bolt until the space between the segment halves on both sides is approximately the same.

Set the torque wrench on 225 in. lbs. and evenly tighten both bolts to this setting. Reset the torque wrench to 250 in. lbs. and evenly tighten the bolts to this setting.

NOTE:

i. Do not tap the clamps at any time during the installation and do not exceed the torque settings.

NOTE:

ii. If any leaks are found on the new seals, no action is to be taken to correct the problem until the vacuum group supervisor or his designate is contacted.

Mark each clamp with the torque setting and the seal type in the area shown on figure 1 with magic marker. Use the following code to record the torque settings. The higher torque should only be used if the seal is reused or to fix a leak after approval.

TORQUE SETTING MARK

250 in.lbs. I
300 in.lbs. III
350 in.lbs. IIII

Under no circumstances should the clamp be torqued higher than 350in.lbs.

The seal code is as follows:

SEAL TYPE	**CODE**
Delta Seal (Helicoflex)	D and RD (for Reused Delta)
Rubber O-Ring	0 (FOR EMERGENCY USE AFTER APPROVAL ONLY)

(No other seal type should be used).

4. RECHECK THE CHAMBER FOR SHORTS

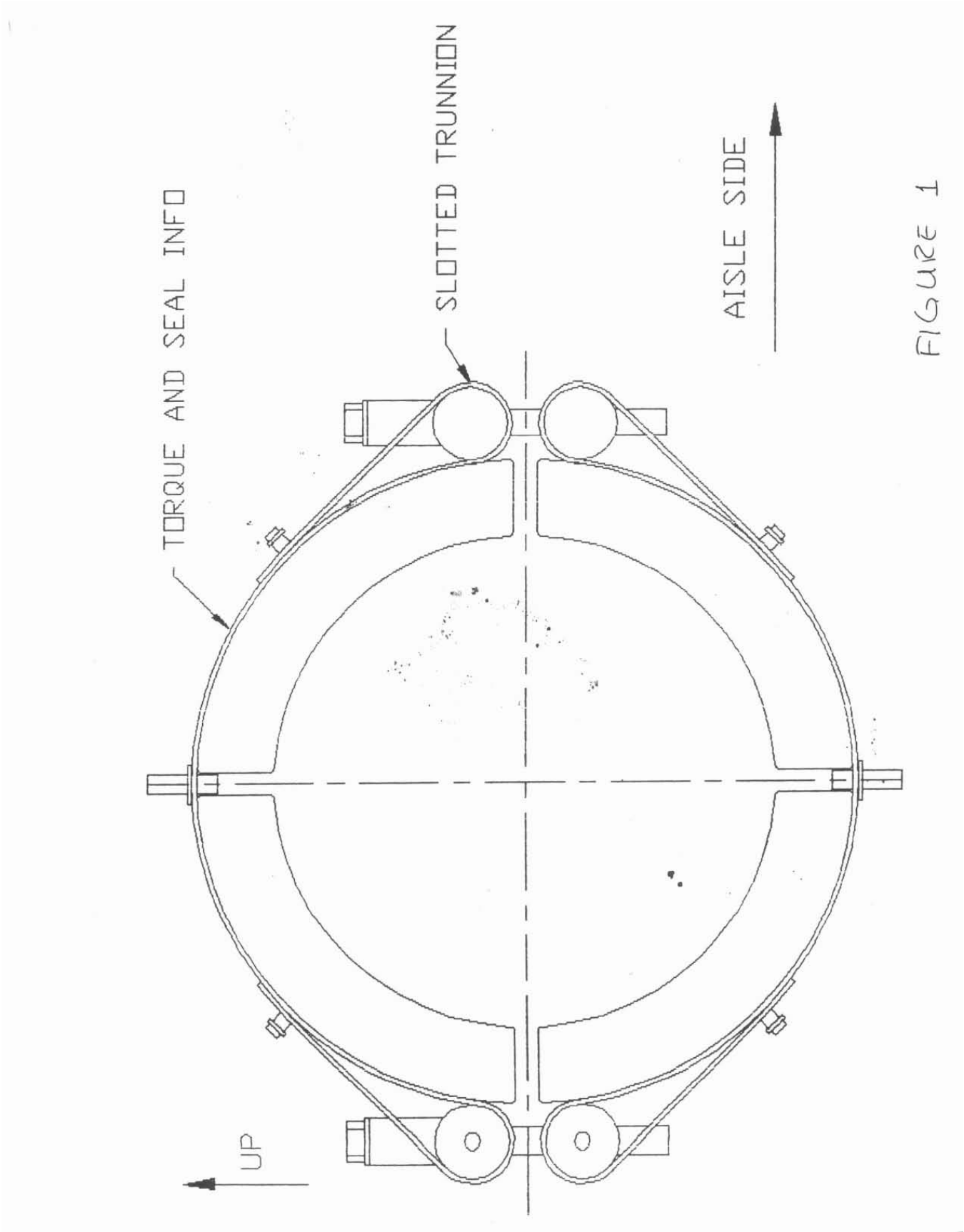

FIGURE 1